LOW-NOISE DUAL OPERATIONAL AMPLIFIER

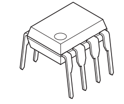
■ GENERAL DESCRIPTION

The NJM2068 is a high performance, low noise dual operational amplifier. This amplifier features popular pin-out, superior noise performance, and superior total harmonic distortion. This amplifier also features guaranteed noise performance with substantially higher gain-bandwidth product and slew rate, which far exceeds that of the 4558 type amplifier.

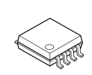
The specially designed low noise input transistors allow the NJM2068 to be used in very low noise signal processing applications such as audio preamplifiers and servo error amplifier.

The D-Rank type products(NJM2068DD/LD/MD) have specified maximum limits for equivalent input noise voltage.

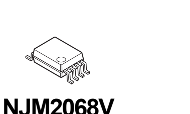
■ PACKAGE OUTLINE



NJM2068D (DIP8)



NJM2068M (DMP8)



NJM2068V (SSOP8)

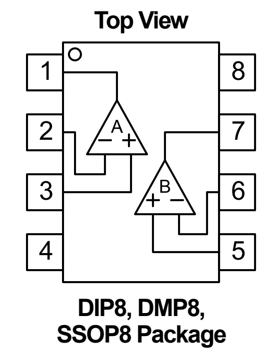
NJM2068L (SIP8)

■ FEATURES

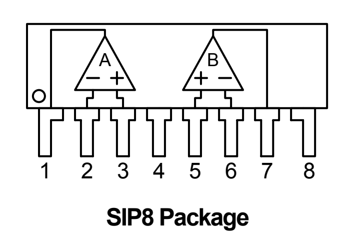
- Operating Voltage ±4V~±18V
- Low Total Harmonic Distortion 0.001%
- Low Noise Voltage 0.56µV (FLAT+JISA)
- High Slew Rate 6V/µs
- Unity Gain Bandwidth 27MHz (f=10kHz)
- Bipolar Technology
- Package Outline DIP8, DMP8, SIP8, SSOP8

■ PIN CONFIGURATION

Top View



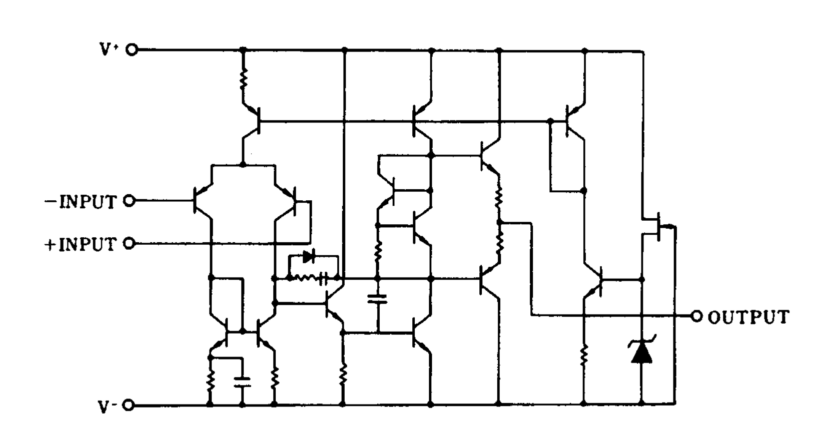
DIP8, DMP8, SSOP8 Package



SIP8 Package

PIN FUNCTION
1.A OUTPUT
2.A –INPUT
3.A +INPUT
4.V^-
5.B +INPUT
6.B –INPUT
7.B OUTPUT
8.V^+

■ EQUIVALENT CIRCUIT (1/2 Shown)



■ ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V^+/V^-	±18	V
Differential Input Voltage Range	V_{ID}	±30	V
Common Mode Input Voltage Range	V_{IC}	±15 (Note1)	V
Power Dissipation	P_D	DIP8: 500 DMP8: 300 SSOP8: 250 SIP8: 800	mW
Operating Temperature Range	Topr	-20~+75	ºC
Storage Temperature Range	Tstg	-40~+125	ºC

(Note1) For supply voltage less than ±15V, the absolute maximum input voltage is equal to supply voltage.

■ RECOMMENDED OPERATING VOLTAGE(Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V^+/V^-		±4	-	±18	V

■ ELECTRICAL CHARACTERISTICS(V^+/V^-=±15V, Ta=25°C, unless otherwise noted.)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	R_S≤10kΩ	-	0.3	3	mV
Input Offset Current	I_{IO}		-	5	200	nA
Input Bias Current	I_B		-	150	1000	nA
Input Resistance	R_{IN}		50	300	-	kΩ
Voltage Gain	A_V	R_L≥2kΩ, V_O=±10V	90	120	-	dB
Maximum Output Voltage	V_{OM}	R_L≥2kΩ	±12	±13.5	-	V
Common Mode Input Voltage	V_{ICM}		±12	±13.5	-	V
Common Mode Rejection Ratio	CMR	R_S≤10kΩ	80	110	-	dB
Supply Voltage Rejection Ratio	SVR	R_S≤10kΩ	80	120	-	dB
Slew Rate	SR	R_L≥2kΩ	-	6	-	V/µs
Gain Bandwidth Product1	G_{B1}	f=10kHz	-	27	-	MHz
Gain Bandwidth Product2	G_{B2}	f=100kHz	-	19	-	MHz
Unity Gain Frequency	f_T	A_V=1	-	5.5	-	MHz
Total Harmonic Distortion	THD	A_V=20dB, V_O=5V, R_L=2kΩ, f=1kHz	-	0.001	-	%
Equivalent Input Noise Voltage	V_{NI}	FLAT+JIS A, R_S=300Ω	-	0.44	0.56	µV
Supply Current	I_{CC}		-	5	8	mA

■ ELECTRICAL CHARACTERISTICS (D-Rank type(Note2), V^+/V^-=±15V, Ta=25°C, unless otherwise noted.)

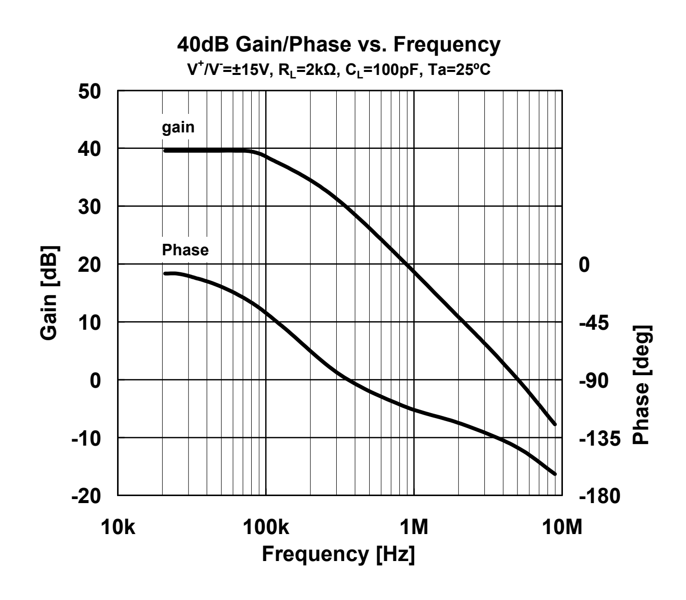
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Equivalent Input Noise Voltage	V_{NI}	RIAA,R_S=2.2kΩ	-	-	1.4	µV

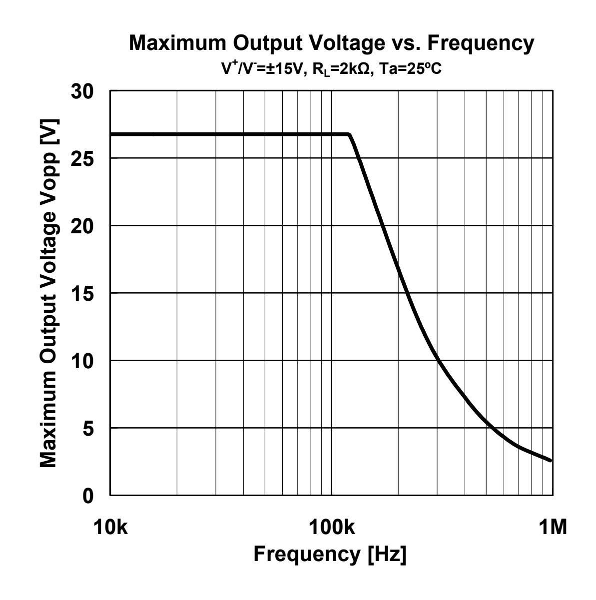
(Note2)D-rank type is a Equivalent Input Noise Voltage selected product. It s only DIP, DMP and SIP package.

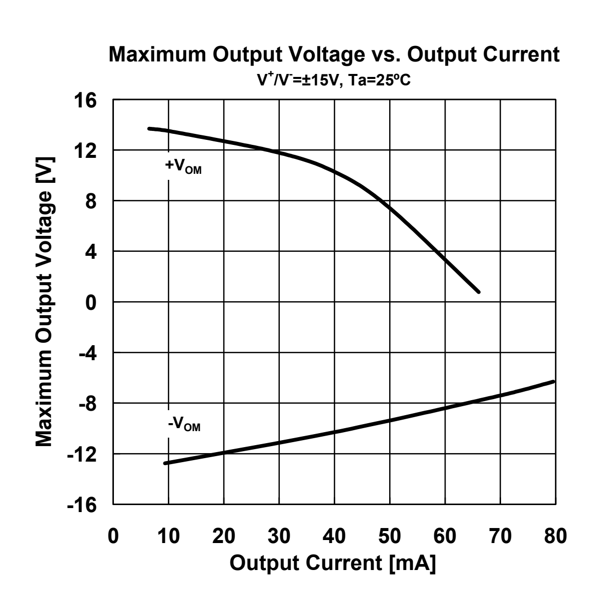
■ NOTICE

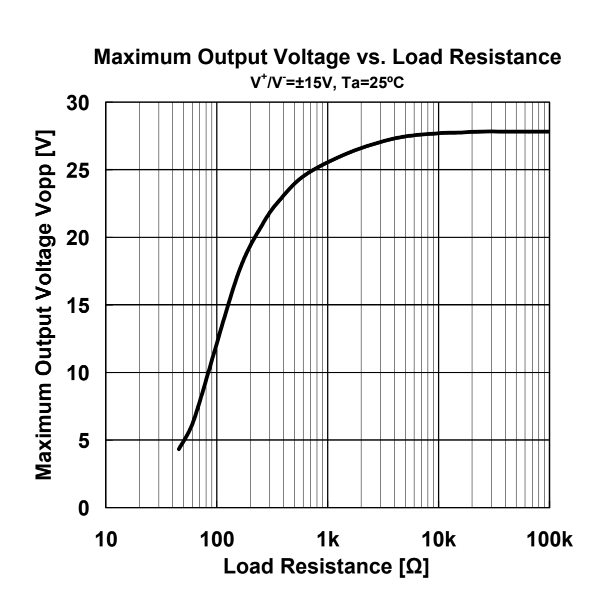
Oscillation might be caused when capacitor type load were connected. It is recommendable to insert series resistor (about 50Ω) at the output for preventing oscillation.

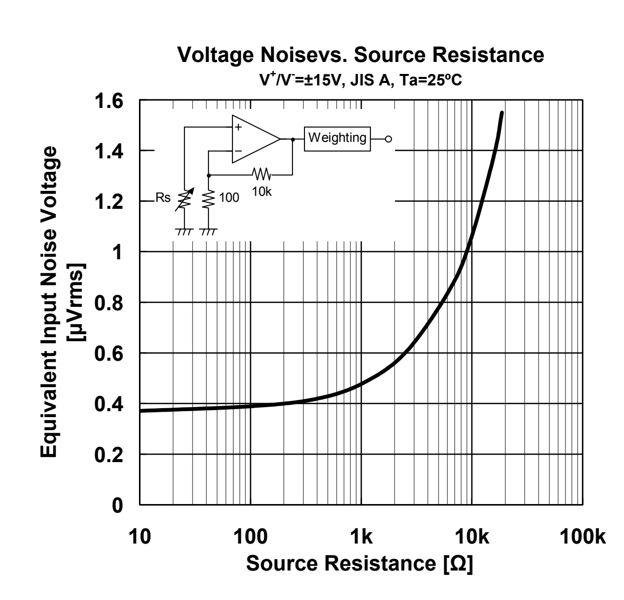
■ TYPICAL CHARACTERISTICS

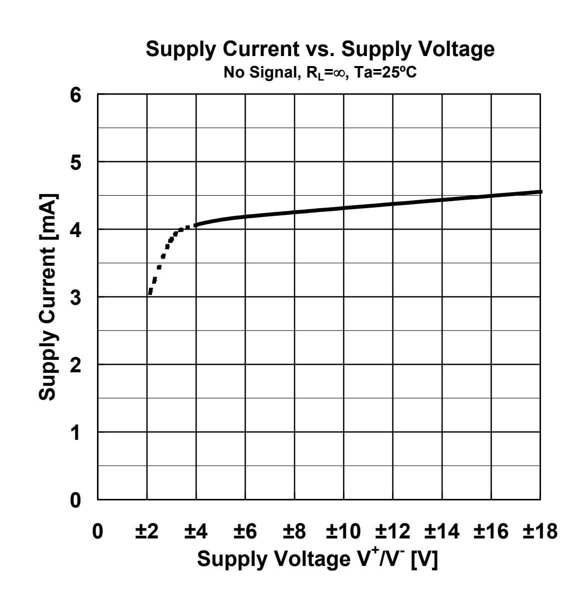




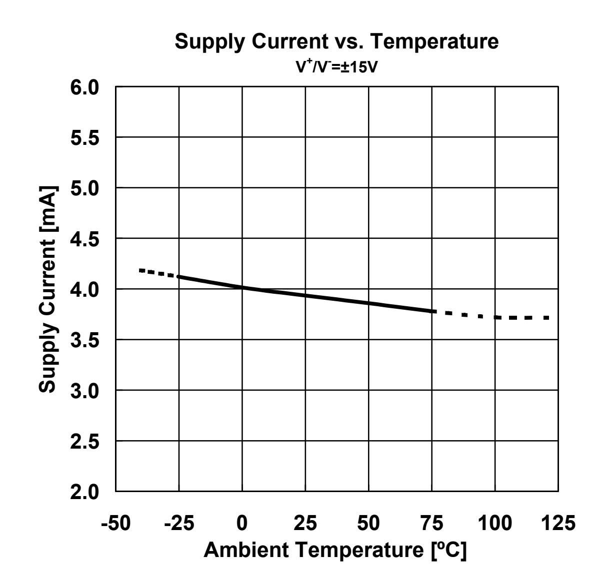


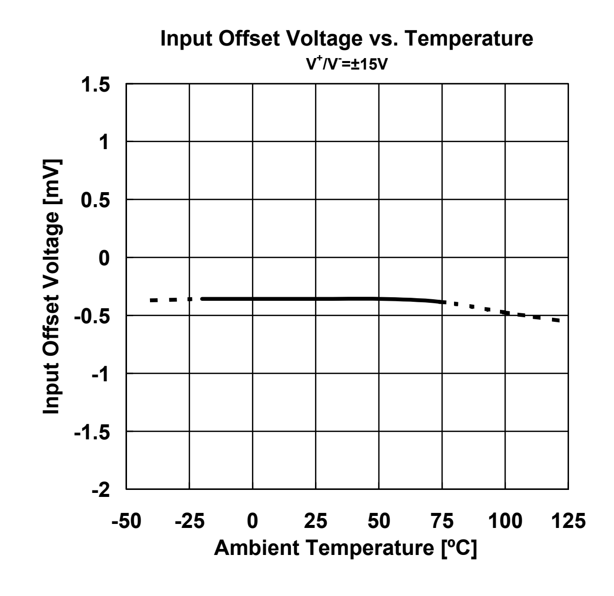


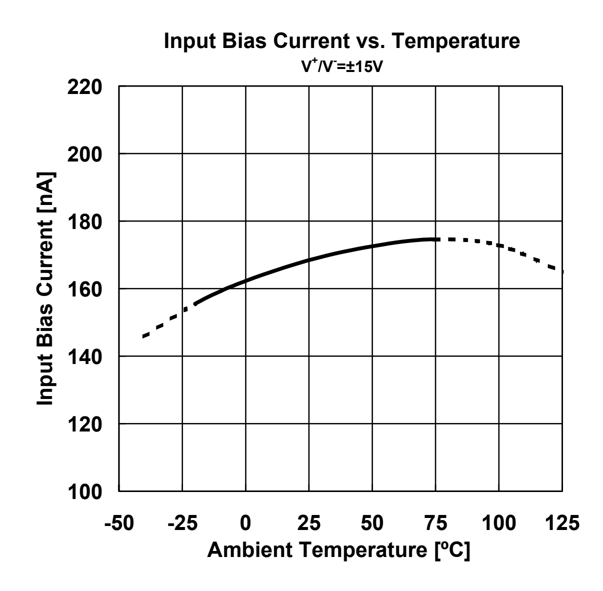


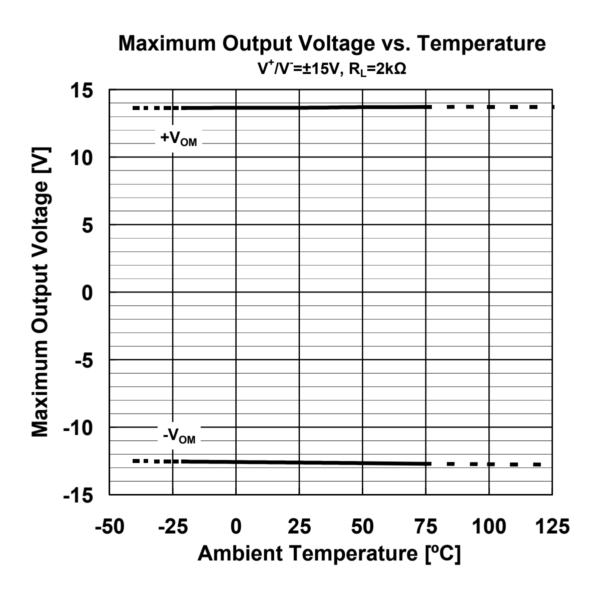


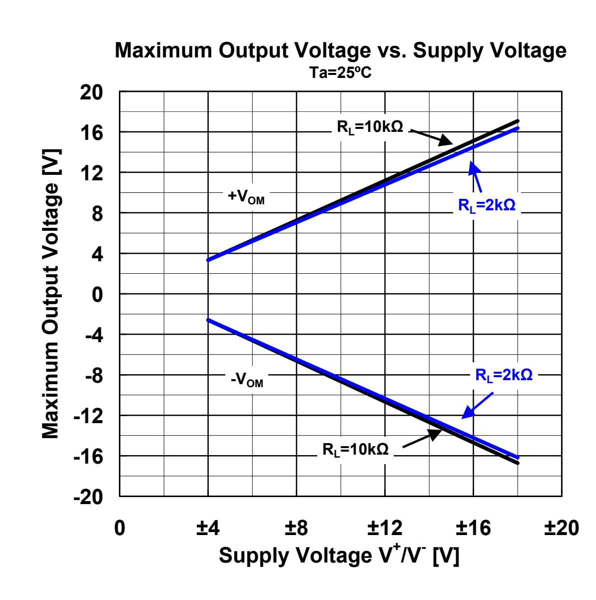
■ TYPICAL CHARACTERISTICS











■ TEST CIRCUIT

Noise Voltage (RIAA) measurement circuit

